

AMENDMENTS TO THE CLAIMS

1. (Original) An etching apparatus, comprising:
 - an etching chamber for receiving a sample to be etched;
 - a source of etching gas; and
 - a collapsible, variable volume expansion chamber, said expansion chamber being in selective fluid communication with said source of etching gas and said etching chamber.
2. (Original) An etching apparatus according to claim 1, wherein said etching gas comprises xenon difluoride and said source of etching gas comprises a vacuum tight container holding xenon difluoride crystals.
3. (Original) An etching apparatus according to claim 1, further comprising a source of mixing gas in selective fluid communication with said expansion chamber.
4. (Original) An etching apparatus according to claim 3, wherein said mixing gas comprises nitrogen.
5. (Original) An etching apparatus according to claim 1, further comprising a vacuum pump in selective fluid communication with said expansion chamber and said etching chamber.
6. (Original) An etching apparatus according to claim 1, further comprising a heating and control apparatus for controlling a temperature of said etching chamber and a temperature of said expansion chamber.

7. (Original) An etching apparatus according to claim 1, wherein said expansion chamber comprises a bellows.

8. (Original) An etching apparatus according to claim 7, wherein said bellows comprise stainless steel edge welded bellows.

9. (Original) An etching apparatus according to claim 1, wherein said expansion chamber comprises a fixed volume chamber having an interior moveable piston.

10. (Original) An etching apparatus according to claim 1, further comprising a sample load lock coupled to said etching chamber.

11. (Original) An etching apparatus according to claim 1, wherein a maximum volume of said expansion chamber is greater than a volume of said etching chamber.

12. (Original) An etching apparatus according to claim 1, further comprising a residual gas analysis apparatus coupled to said etching chamber.

13. (Original) An etching apparatus according to claim 1, further comprising means for analyzing gasses drawn from said etching chamber.

14. (Canceled)

15. (Canceled)

16. (Canceled)

17. (Canceled)

18. (Canceled)

19. (Canceled)

20. (Canceled)

21. (Canceled)

22. (Canceled)

23. (Canceled)

24. (Canceled)

25. (Previously Amended) An etching apparatus utilizing an etching gas generated from a nongaseous material, comprising:

an etching chamber for receiving a sample to be etched, said etching chamber being in selective fluid communication with a vacuum pumping source;

a source of said etching gas;

a first expansion chamber in selective fluid communication with said source of etching gas and said etching chamber, said first expansion chamber having a first fluid connection to a vacuum pumping source, said first fluid connection being independent from said etching chamber and said source of said etching gas; and

a second expansion chamber in selective fluid communication with said source of etching gas and said etching chamber, said second expansion chamber having a second fluid connection to a vacuum pumping source, said second fluid connection being independent from said etching chamber and said source of said etching gas;

wherein said first expansion chamber may be selectively evacuated through said etching chamber or through said first fluid connection exclusive of and

independently from said source of said etching gas, and wherein said second expansion chamber may be selectively evacuated through said etching chamber or through said second fluid connection exclusive of and independently from said source of said etching gas.

26. (Original) An etching apparatus according to claim 25, wherein said etching gas comprises xenon difluoride and said source of etching gas comprises a vacuum tight container holding xenon difluoride crystals.

27. (Original) An etching apparatus according to claim 25, further comprising a source of mixing gas in selective fluid communication with said first expansion chamber and said second expansion chamber.

28. (Original) An etching apparatus according to claim 27, wherein said mixing gas comprises nitrogen.

29. (Previously Amended) An etching apparatus according to claim 25, further comprising a second source of said etching gas in selective fluid communication with said first expansion chamber and said second expansion chamber.

30. (Canceled)

31. (Original) An etching apparatus according to claim 25, further comprising an automatic heating and control apparatus for controlling a temperature of said etching chamber, a

temperature of said first expansion chamber, and a temperature of said second expansion chamber.

32. (Original) An etching apparatus according to claim 25, further comprising a sample load lock coupled to said etching chamber.

33. (Original) An etching apparatus according to claim 25, further comprising a residual gas analysis apparatus coupled to said etching chamber.

34. (Original) An etching apparatus according to claim 25, further comprising means for analyzing gasses drawn from said etching chamber.

35. (Original) An etching apparatus according to claim 25, wherein said first and second expansion chambers have a fixed volume.

36. (Original) An etching apparatus according to claim 25, further comprising a third expansion chamber in selective fluid communication with said source of etching gas and said etching chamber.

37. (Original) An etching apparatus according to claim 36, said first expansion chamber having a fixed volume equal to A, said second expansion chamber having a fixed volume equal to 2A, and said third expansion chamber having a fixed volume equal to 4A.

38. (Original) An etching apparatus according to claim 36, said first expansion chamber having a first fixed volume, said second expansion chamber having a second fixed volume, and said third expansion chamber having a third fixed volume, said first, second and third fixed volumes being equal to one another.

39. (Original) An etching apparatus according to claim 27, wherein one of said first and second expansion chambers comprise a variable volume expansion chamber.

40. (Original) An etching apparatus according to claim 27, wherein said first and second expansion chambers each comprise a variable volume expansion chamber.

41. (Previously Amended) An etching apparatus according to claim 27, wherein said source of said etching gas is in selective fluid communication with said etching chamber.

42. (Original) An etching apparatus according to claim 41, further comprising a flow controller connected between said source of said etching gas and said etching chamber and a vacuum pump in selective fluid communication with said etching chamber.

43. (Original) An etching apparatus according to claim 42, further comprising a source of mixing gas in selective fluid communication with said etching chamber and a second flow controller connected between said source of mixing gas and said etching chamber.

44. (Original) An etching apparatus according to claim 42, further comprising means for controlling the conductance of said vacuum pump.

45. (Original) An etching apparatus according to claim 41, wherein said source of etching gas comprises first and second vacuum tight containers holding said etching gas, said first vacuum tight container and said second vacuum tight container each in selective fluid communication with said second etching chamber, said apparatus further comprising a first flow controller connected between said first vacuum tight container and said etching chamber, a second flow controller connected between said second vacuum tight container and said etching chamber, and a vacuum pump in selective fluid communication with said etching chamber.

46. (Original) An etching apparatus according to claim 45, further comprising a source of mixing gas in selective fluid communication with said etching chamber and a third flow controller connected between source of mixing gas and said etching chamber.

47. (Original) An etching apparatus according to claim 45, further comprising means for controlling the conductance of said vacuum pump.

48. (Canceled)

49. (Canceled)

50. (Canceled)

51. (Canceled)

52. (Canceled)

53. (Canceled)

54. (Canceled)

55. (Canceled)

- 56. (Canceled)
- 57. (Canceled)
- 58. (Canceled)
- 59. (Canceled)
- 60. (Canceled)
- 61. (Canceled)
- 62. (Canceled)
- 63. (Canceled)
- 64. (Canceled)
- 65. (Canceled)
- 66. (Canceled)
- 67. (Canceled)
- 68. (Canceled)
- 69. (Canceled)
- 70. (Canceled)
- 71. (Canceled)